

Note on the appearance of Jupiter, August 20th, 1867.

By Mr. Hough.

The planet was examined by me several times between 8^h 30^m and 13^h 55^m G. M. T., but no observations were made of the times of ingress and egress on account of the great tremor of the planet's limb; it was, however, noticed that the fourth satellite was clear of the planet about five minutes before the time given in the *Nautical Almanac*. When the planet was best defined there were seen upon it the shadows of the first, third, and fourth satellites, and the disks of the third and fourth. The disk of the third was bright and like a dew-drop, but that of the fourth seemed as dark as its shadow. Perhaps this was owing to the difference in the brightness of the two portions of the planet's disk on which the satellites were projected, the upper portion being white and the lower portion dusky brown.

The instrument employed was the 11-foot Equatoreal.

Wrottesley Observatory.

Memorandum on Preparations for Observing the Total Eclipse of the Sun on August 18, 1868. By Major J. F. Tennant.

In consequence of my paper on this subject, read at the Meeting of the Society on the 8th March last, the Council appointed a committee to further the project, and the instruments and methods were the subjects of considerable discussion. Eventually it was decided that there should be provided for Photography a silver glass reflector, equatorially mounted and driven by clockwork, and the Astronomer Royal offered to lend me (with the consent of the Admiralty) two telescopes from the Royal Observatory.

Estimates of the probable cost of the instruments having been obtained, they were submitted by the Astronomer Royal to the Secretary of State for India on the 15th June. On the 15th July I received through Mr. Airy a sanction for the estimated expense, and the instruments were ordered on the same day. Within a day or two I called at the India Office regarding the personal for the proposed operations, and submitted an estimate of the probable expense on the 23rd July, having previously ascertained that there would be no difficulty in obtaining such men as I wanted from the Royal Engineers. To this estimate I have as yet received no sanction.

I now proceed to the instruments and my proposed proceedings.

First as to *Photography*. It was found that the conditions as to time rendered it unadvisable to attempt the use

of a speculum of more than $9\frac{1}{4}$ inches diameter. This size has therefore been determined on. The picture will be taken at the side of the tube (the telescope being Newtonian), and provision is made both in the plane mirror and tube to insure an equally lighted field of upwards of a degree in diameter, in the hope that some traces of the structure of the corona may be obtained in the photographs. Unfortunately there have been very great and unavoidable delays with this instrument. The low latitude in which it has to be used, and the arrangements for Photography, have rendered a new design of almost every part necessary, and have, of course, entailed new patterns for all the castings. In making these changes, decisions have had to be made on various points of detail; and it is only due to Mr. De La Rue to express my obligations to him, not only for his advice, but for opportunities of seeing the operations of Photography, and trying some experiments with his instrument.

Polarization. The previous results in this matter have been so contradictory, that I have been anxious to obtain some simple test which shall not be liable to be misinterpreted, and to provide the means besides of verifying its indications. The instrument to be used is a 42-inch telescope, mounted firmly with an altitude-and-azimuth motion, which has been lent by the Astronomer Royal. For this a Ramsden eye-piece has been constructed carrying the proposed apparatus. This consists of an arrangement by which the plane of polarization can be determined in three ways.

1st. By the extinction of the polarized portion of the light by means of a Nicol's prism, reducing the intensity of the image to a minimum.

2nd. By Savart's test where parallel fringes are formed by the interference of the polarized rays, the centre one being either dark or light as its plane is in or perpendicular to the plane of polarization.

3rd. By a Double-image Prism and Analysing Plate, giving images of complementary colours with polarized light, in using which the field of view is bounded by a stop in the common focus of object-glass and eye-piece.

The first two of these tests can be instantaneously interchanged, and there is no difficulty in using all the tests successively in two minutes. There is in the focus of the object-glass a wire whose position with respect to the telescope can be determined by graduations, and to which all the tests are so adjusted, that in every case when the test phenomenon is at its maximum, the wire represents the plane of polarization. This wire also serves as an index to the central band in Savart's test, in which it is included. This is of importance, because, though in the case of a nearly white object where nearly all the light is polarized, the central band alone is unfringed with colour, and the intensity of the fringes rapidly

decreases; yet when the object is highly coloured, and especially if only a small percentage is polarized, it is not easy to distinguish this band without very close attention. I believe myself this will be the most useful test, but it will be seen that its indications can be verified.

Spectrum Observation. The Astronomer Royal has lent me one of the old collimators of the Transit Circle. For this an equatorial mounting is being made sufficient to follow any object steadily, but without clockwork. The spectroscope will allow of the spectrum being compared with a scale of equal parts, by means of which its peculiarities can be referred to the lines of the solar spectrum. At the suggestion of the Astronomer Royal, an arrangement has been made by which the spectrum can be observed in a bright field, which, however, can be instantaneously changed to a dark one. I am very doubtful if this bright field can be of any use, but the object under inspection can be identified by means of a finder, so that there will be no doubt.

It is proposed that instruments having reached India should be erected in a favourable place at or near Gunttoor, where experiments can be carried on to ensure the success of the photographic operations. To assist me I propose to take out three non-commissioned officers of the Royal Engineers, on whom all the mechanical portion of the Photography will devolve; and it is most fortunate that the central line passes close to places so favourable as Gunttoor and Masulipatam, where we shall have to reside some time; but for this circumstance such arrangements could hardly have been made.

Captain Branfill (an officer of the Indian Survey) will assist me by taking charge of the Polarization apparatus, and I hope to have some further aid from Colonel Walker's establishment. Colonel Thuillier, the Surveyor General, will be requested to lend me from his stores one or two chronometers and any further small aid I may need in instruments.

All these preparations will, however, be useless, unless the necessary remaining expense is sanctioned. It is, therefore, fortunate that the Royal Society intend, it is understood, to make arrangements for securing results on the Spectrum and Polarization.

London, Oct. 4, 1867.

Oct. 14. Since writing this I have received sanction for the proposed expenses.